PSYCHOLOGICAL IMPACT OF NOISE EXPOSURE AMONG MACHINE OPERATORS AND NON-MACHINE OPERATORS IN CONSTRUCTION SITES IN PERAK, MALAYSIA

KEE HENG YIK

BACHELOR OF OCCUPATIONAL SAFETY AND HEALTH WITH HONORS

UNIVERSITI MALAYSIA PAHANG

SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Occupational Safety and Health.

_____

(Supervisor's Signature)

Full Name : NUR SYAFIQAH BT. FAUZAN

Position : LECTURER

Date : 18 JANUARY 2019

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

_____

(Student's Signature)

Full Name : KEE HENG YIK

ID Number : PA15040

Date : 18 JANUARY 2019

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KEE HENG YIK

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ABSTRAK

Bunyi bising pembinaan adalah salah satu masalah pencemaran bunyi serious di mana setiap projek pembinaan pasti mempunyai masalah pendedahan bunyi bising. Di Malaysia, laporan statistik menyatakan bahawa tapak pembinaan mempunyai pendedahan yang tinggi terhadap beberapa isu terutamanya pendedahan terhadap bunyi bising di mana pendedahan kepada bunyi bising disenaraikan sebagai kedudukan 2 dengan frekuensi 134 tapak pembinaan daripada 140 tapak pembinaan. Laporan telah menunjukkan bahawa bahaya kebisingan merupakan salah satu punca utama terjadinya kemalangan dalam industri pembinaan kerana bunyi bising menjejaskan keselamatan dan kesihatan dalam kalangan pekerja pembiaan. Hal ini demikian, bunyi bising ada isu yang serious dalam kalangan industri pembangunan di Malaysia manakala impak pendengaran bunyi bising perlu dijalankan dalam kajian ini. Kajian ini menumpukan perhatian dalam mengenalpasti tahap pendedahan seseorang terhadap bunyi dan kelaziman simptom kesan kesihatan psikologi dalam kalangan pekerja pengendalian mesin dan bukan pengendalian mesin di tapak pembinaan Perak. Enam puluh satu pekerja pembinaan dipilih sebagai responden da dikategorikan kepada kumpulan pengendaian mesin dan kumpulan bukan pengendalian mesin. Semua responden telah dihendaki untuk memasang dosimeter bunyi peribadi semasa waktu kerja selama 8 jam untuk mendapatkan data mengenai tahap pendedahan bunyi bising dalam kalangan pekerja. Untuk kelaziman simptom kesan kesihatan psikologi akibat pendedahan bunyi bising, soal selidik dan sesi soal jawab dijalankan dalam kalangan pekerja pembinaan yang terpilih untuk tujuan pengumpulan data. Kajian ini mendedahkan bahawa tahap pendedahan bunyi dalam kalangan pekerja adalah tinggi di mana purata tahap pendedahan untuk kumpulan pengendalian mesin (81.81dBA) jauk lebih tinggi berbanding dengan purata tahap pendedahan bunyi bising untuk kumpulan bukan pengendalian mesin (74.71dBA) melalui analisis. Selanutnya, kelaziman simptom kesan kesihatan psikologi adalah tinggi dalam kalangan pekerja di mana 93.5% pengendali mesin dan 43.3% pengendali bukan mesin berasa ketegangan (tension) apabila bekerja dalam suasana kerja yang bising. Melalui analisis, hasil menunjukkan terdapat perbezaan yang signifikan di mana p-value kurang dari 0.05 antara pengendali mesin dan pengendali bukan mesin untuk beberapa kelaziman simptom kesan kesihatan psikologi di mana pengendali mesin mempunyai kelaziman yang lebih tinggi berbanding dengan pengendali bukan mesin. Akhir sekali, kajian menunjukkan bahawa terdapat hubungan yang signifikan dan positif antara tahap pendedahan bunyi bising dan kelaziman untuk sebahagian simptom kesan kesihatan psikoloi di mana sakit telinga (p-value=0.011), perubahan ketara dalam pendengaran (p-value=0.007), and pening (p-value=0.016) dalam kalangan pengendali mesin manakala kehilangan pendengaran secara tiba-tiba (p-value=0.047), kemarahan dan agresif (p-value=0.027), pening (p-value=0.050), tekanan (p-value=0.031) dan ketegangan (p-value=0.028) di tempat kerja yang bising untuk pengendali bukan mesin di tapak pembinaan.

ABSTRACT

Noise from the construction activities is one of the severe issue of noise pollution where there must be noise pollution produced at every construction projects. In Malaysia, previous statistical report has stated that the construction sites have high exposure of several hazards especially the noise hazard where noise hazard was ranked 2 with frequency 134 out of 140 sites. The previous reports reveal that the noise hazard is one of the main causes of the occurrence of accidents in construction industry as noise hazard affect the safety and health among the construction workers. As the noise hazard is reported as serious issue among the construction industry in Malaysia, an impact of noise exposure need to be conducted in this study. This study is mainly focus in identifying the personal noise exposure level and the prevalence of psychological health effect symptoms among the machine operators and non-machine operators on construction site in Perak. Sixty-one construction workers were selected as respondents and categorized into machine operators group and non-machine operators group. All respondents were monitored for 8 hours working time using personal noise dosimeter for the personal noise monitoring. For the prevalence of psychological health effect symptoms due to noise exposure, questionnaires and interview sessions were done among the selected construction workers. The result obtained reveals that the personal noise exposure level among the construction workers is high where the mean of personal noise exposure level for machine operators group (81.81dBA) is significantly higher compared to the mean of personal noise exposure level for non-machine operators group (74.71dBA). Besides, the prevalence of psychological health effect symptoms is high among the construction workers where 93.5% of machine operators and 43.3% of non-machine operators feel tension when working in noisy work environment. Through the independent chi-square test, results with the p-value less than 0.05 show that there was significant differences between the machine operators and non-machine operators for several prevalence of psychological health effect symptoms where machine operators has significantly higher prevalence compare to non-machine operators. Lastly, result obtained through Binary Logistic Regression, it reveals that there is significant and positive coefficient between the personal noise exposure level and the prevalence of several psychological health effect symptoms on ear pain (p-value=0.011), noticeable change in hearing (p-value=0.007), and dizziness (p-value=0.016) for machine operators and sudden hearing loss (p-value=0.047), anger and aggressiveness (p-value=0.027), dizziness (p-value=0.050), stressful (p-value=0.031) and tension (p-value=0.028) in noisy work environment for non-machine operators in construction site.

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LIST OF SYMBOLS

dBA	A-Weighted Decibels
dBHL	Decibel Hearing Level
df	Degree of Freedom
mmHg	Millimeters of Mercury as in a Blood Pressure Reading
Hz	Hertz
TWA	A Time-weighted Average

LIST OF ABBREVIATIONS

DOSH	Department of Occupational Safety and Health
NHIS	National Health Interview Survey
NIHL	Noise-Induced Hearing Loss
NIOSH	National Institute of Occupational Safety and Health
PPE	Personal Protective Equipment
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SOCSO	Social Security Organization
SPSS	Statistical Package for Social Science
TTS	Temporary Threshold Shift
UMP	Universiti Malaysia Pahang
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Introduction

Throughout this chapter, the general ideas about this study will be highlighted. This chapter includes background of study, conceptual framework, problem statement, objectives, research question, hypothesis, significance of study, scope of study, study ethics, and the operational definition.

1.2 Background of Study

Sound is defined as the propagation of pressure waves radiating through an elastic medium from a vibration source (Chauhan, 2015). According to NIOSH, the noise is defined as any unwarranted disturbance within a useful frequency band (Concha-Barrientos et al., 2004). Generally, noise is classified into occupational noise or environmental noise where in all human daily activities either day time or night time, noise always presents and gives impact towards human well-being.

Noise then is described as common occupational hazard in most of the workplaces especially the iron and steel industry, manufacture industry and construction industry (Gerges et al., 1992). The construction activity is categorized as one of the sources of noise pollution where the noise is unwanted sound which might be unnoticed and lead to psychological and physical health effect such as stress towards the people work or live near the construction site (Baba et al., 2011).

Nowadays, noise is one of the main pollutants around the world that could impacts the human working and living environment (Kantová, 2017). The impacts towards human such as anger and aggressiveness, headaches, tension, inadequate sleep, and several

diseases on human body system. The human has tried to protect themselves against high noise exposure level through both of materially and legislation actions.

The occupational hearing loss issue is increasing day-to-day among most of the people that exposed to noise at their workplaces. Exposure towards excessive noise for in long term, repeatedly exposure to noise and single exposure towards extremely intense noise will cause serious damage to the auditory system of human and this results in hearing loss, termed noise-induced hearing loss (NIHL) (Peter S. Roland et al., 1997). The noise-induced hearing loss (NIHL) usually slow in onset but will progress relentlessly as long as the exposure continues on the people and irreversible.

Due to the rapid industrialization and urbanization, construction industry has become more and more concern in Malaysia. The construction activities have led to several hazards especially the noise hazard where the noise hazard has become a common and serious source of environmental noise that gives harm to human's health (Liu et al., 2017).

The construction industry is described as a major element of economic force in Malaysia where it also be categorized as one of the most hazardous industry. As the construction industry normally generates noise hazard, this causes most of the construction workers to work under overexposed risk of noise (Said et al., 2014). According to the Social Security Organization (SOCSO) reports 2016, the construction industry in Malaysia had the accident cases reported that was 7338 cases, the third highest number of cases reported industry among all other industries such as trading, transportation and storage (Social Security Organization, 2016).

Moreover, the construction site is always a noisy workplace no matter what kind of precautions are taken. A regular 8 hours exposures to 85dBA noise exposure level could damage the hearing system. The higher the noise exposure level, the faster the hearing loss. As most of the equipment on construction site are above 85dBA noise exposure level such as Jackhammer with 100dBA, and hammer drill with 115dBA, the construction workers are high risk towards the Noise-Induced Hearing Loss (NIHL) or other psychological health effect (Lydia Baugh, 2016).

In this study, the mainly focus issue is to identify the personal noise exposure and the prevalence of psychological health effect symptoms among machine operators and non-machine operators on construction site in Perak, Malaysia. This is a cross sectional study by which simple random sampling method is used in choosing 31 machine operators and 30 non-machine operators from the selected construction site. A validated questionnaire about respondents' demographic information, occupational background related on noise exposure, prevalence of psychological health effect symptoms and health history is designed to identify the effects on workers' health due to noise exposure. The Statistical Package for Social Sciences (SPSS) is required to use for data entry and statistical analyses of data. The Personal Noise Dosimeter helps in identifying the personal noise exposure level among the construction workers.

1.3 Conceptual Framework

Figure 1.1 shows the conceptual framework for this study which intended to study the noise exposure in the construction industry.

The conceptual framework was then contributed the ideology towards the factors which cause the physical effect such as injury due to accident related to hearing ability and the psychological health effects such as noise-induced hearing loss, anger and aggressiveness, tinnitus, psychological stress, tension and difficulty in concentrating.

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